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# MAIN SOURCES OF INCREASING THE PRODUCTIVITY OF ALLUVAL SOILS OF MEDIUM SALT GRAZINE OF BUKHARA REGION

MUHAYYO BAFOEVNATOGAEVA,
teacher of the Department of Biology at Bukhara State University

ZAKIYA TESHAYEVNA SAFAROVA,
teacher of the Department of Biology at Bukhara State University

NODIRA ABDUVAKHITOVNA AZIZOVA,
teacher of the Department of Biology at Bukhara State University
zakiya.safarova@bk.ru

**ABSTRACT:**

**The main source of increasing the fertility of alluvial soils of moderately saline meadows of Bukhara region, green microflora - Chorella vulgaris (Beyer and Scenedesmus obliquus (Radish) and biofertilizers)in improving microstructure of the soil, increasing the soil fertility by the acceleration of biologic process in the soil, in betterment of cotton harvest and lying the foundation for new technology for its implementaion.**

**KEYWORDS: humus, green algae, soil, microstructure, productivity of plants, microbiological processes, Chlorella vulgaris (Beyer) and Scenedesmus obliquus.**

**INTRODUCTION:**

Soil fertility depends on the physicochemical properties, humus layer, organic minerals and, in particular, the stacking, amount and biogenic activity of various beneficial microorganisms in its composition. In the growing process and development and productivity of plants, the organic and inorganic substances present in the soil are very important and crucial, and it is prevalent to safeguard their diversity and the enzymatic activity of microorganisms. Therefore, one of the most important and urgent tasks of our country is to create methods for studying and managing the arable land, quality of soil composition, chemical and biological processes, especially microbiological processes, improving soil structure, increasing productivity in order to solve the problems of maintaining ecological balance in nature and protecting the natural environment.

**METHODS:**

It is known that intensive technologies are used to obtain high yields from agricultural lands, including mineral fertilizers (nitrogen, potassium phosphorus) and partially organic (manure, partially decomposed plant waste) fertilizers. Biological fertilizers created in recent years (containing special biohumus, nitrogen-fixing and putrefactive bacteria, fungi, microorganisms with antagonistic properties that neutralize pathogenic microorganisms in the soil) include various sediments that serve as a source of nitrogen, minerals and vitamins through the application of algae, active (sedimentary mud) which gives high efficiency. The application of these fertilizers not only allows us to reap high yields from crops, but also helps to improve soil microstructure, increase plant resistance to various diseases (such as gummosis, fusarium, wilt, rotten roots), and improve crop quality in the long run.The long time processof chronic cotton planting, pre-winter chemical treatment of seeds, excessive use of mineral fertilizers to increase high yields in different regions of various types of soils have inadequately affected not only on the cotton crops, but also on the destruction of the structure, composition, erosion of the fertile soil layers, and adversely influenced the soil microflora and its biological activity.In addition, the salinity of soils of the Republicin deserts, meadows, bald, sandy pastures as well as high temperatures, hot winds and droughts are the main factors that directly affect soil fertility whereas, this issue needs to be addressed immediately in guarranteeing the development of agriculture. The complexity and strength of the structures in toxic chemicals used affect the chemical, physical and biological properties of the soil in particular, if the assimilation (per hectare during the growing season of cotton) of 2-3 kg of catarrh, 25-30 kg of sulfur, 20-25 kg of various peptides, 20 kg of magnesium chloride, 300 kg of nitrogen, 200-250 kg of phosphorus (ammophos), 100 kg of potassium mineral fertilizers is taken into account. As a result, along with the leaching of saline in the fertile layer of soil, water-soluble nutrients are also washed away by water, or seeped into the deeper layers of the earth with groundwater. Therefore, the fertility of irrigated meadow alluvial soils decreases, in some cases, sharply declines. In recent years, with the leaching of humus in the soil and their internal fulvic acids, the transition to humic acids slowed down, and the amount of hummus in general decreased spontaneously [Jumaniyazov, 1991; Yuldasheva, 2000, 2008 ].In addition, due to the compaction of irrigated meadow soils and the lack of organic matter, the amount of water consumed per hectare of land is also increasing. The water demand of soils with sufficient organic matter required 900-1100 $m^3$ of water per one irrigation of cotton fields, meanwhile these cotton fields now require 1400-1600 $m^3$ of water. It is known that the high productivity of irrigated lands is preserved through humus substances, microorganisms belonging to different taxonomic groups, single-celled simple animals, algae, nitrogen, phosphorus, potassium, calcium, copper, chalk and other mineral elements.Of course, the physicochemical structure of the soil, its location in different latitudes, the level of development, metrological conditions, seasons are also very important. The completeness of these conditions ensures positive influnce not only on the efficiency of cultivation, but also on the quantity and quality of crops and the acceleration of early ripening process as well as stronger disease resistance of plants. In this regard, the production of biofertilizers and their application in practice is the focus of many foreign and domestic researchers. The use of biofertilizers containing Rhizobium Azotbacter bacteria, cyanobacteria and green micro-algae, soil microorganisms will provide an opportunity to prolonging the longevity of microorganisms in the soil and increase the quantity of mineral elements absorbed by plants. At present, the technology of application of the suspension of algae microflora in cotton is used in some districts of Khorezm and Kashkadarya regions. However, in the ecological conditions of Bukhara region, no biological agents were used to grow crops in moderately saline grassland soils. The main source of increasing the fertility of alluvial soils of moderately saline meadows of Bukhara region are green algae - Chorella vulgaris (Beyer and Scenedesmus obliquus (Radish) and biofertilizers) which improve the microstructure of the soil by accelerating the biological processes where it will then increase its productivity, as well as lay the foundation for new technologies for the use in growing cotton. For the purpose ofincreasing the amount of Chorella vulgaris (Beyer and Scenedesmus obliquus (Radish), nitrogen and goose must first be used to create a modified nutrient medium by determining the optimal amount of suitable grwoing environment and increase the amount of cells in the prepared suspension by 1.5-2 times (10-15mln / ml) compared to the previously described technology (7-8mln / ml).Secondly, the use of green micronutrients increases the activity of oxidation-reduction and hydrolytic enzymes (catalase, protease, perioxidase, polyphenol oxidase, especially urease and invertase) in the soil by 2-3 times, resulting in the decomposition of organic matter in the soil and their plant assimilation. The transition to the form is accelerated through this process. Thirdly, the use of Yashi microswaters and biofertilizers in irrigated, meadow, moderately and strongly saline soiled cotton fields accelerates the process of soil respiration in the first 30 days.The total amount of microorganisms, especially ammonia, when used 2-4 times, increases the enzymatic activity of the soil. Fourthly, soaking untreated cotton seeds in a suspension of green microflora (up to 15 million cells in 1 ml of suspension) before sowing, spraying at the stage of 4-5 leaf formation, and re-biofertilization at 1.9-2 times higher rates will escalate the ammonifactors from 1 million 600 thousand to 3 million 100 thousand, oligonitrophilic bacteria from 2 million 900 thousand to 4 million 100 thousand, fungi from 8 thousand to 12 thousand, and green algae from 2 million to 100 thousand to 4 million.

The technology of application of biofertilizers in arable soils with different levels of germination has been improved, while seeds treated with biotic have germinated evenly in 3-4 days, the seeds of the control variant have grown in 8-10 days. The relative cotton yield was reached 10-12 days ago, the total number of microorganisms in the soil increased by 2 times, and the activity of enzymes increased by 3-4 times. Furthermore, the ecological condition of highly saline soils of Bukhara region improves, the use of mineral fertilizers gets halved, productivity increases by 5-6 times, fiber quality improves, cotton disease (vilt, rottening, gommoz) decreases over time.Re-sowing was not observed in farmer communities and farms when seeds were sown without treatment.Soil salinity decreased sharply.Macro and micro elements, the amount of microorganisms in the soil and the biological activity of ferments increased.By increasing soil fertility, the number of bowls in the core of the cotton reached up to 8-14.

It is known that black soil is very rich in organic mineral reserves compared to other soil zones. It is richer in other elements, such as nitrogen, phosphorus, and trace elements, with a content of 10-12% of humus in the upper layer of the soil. Despite the abundance, the activity of enzymes in this zone is very low, so the organic matter deposits are characterized by slow decomposition. Although the organic matter reserves of the soils found in Central Asia are very low, the enzyme activity in them is proven to be strong. Enzymes in the black soil zones, especially the peroxidase enzyme, were found to be 0–1.7 mg/g in the soil, while the polyphenol oxidase enzyme was found to be 0.70–0.95 mg/g. This means that the decomposition and mineralization of organic matter residues in the soils of this zone is slow. That is, the process of assimilation of organic matter by plants is very low.

That is because, their biological activity adversely affects the strong performance of substances under adverse conditions (air temperature, pH rate of soil and humidity). In addition, in gray soils the amount of humus is low, for example, in the upper layer, only 1-1,5% is common. In this zone, the activity of enzymes, in particular, perioxidase, is 3-3.5 mg/g, and the activity of polyphenol oxidase is 0.50-070 mg/g. These figures are based on the concentration of organic matter in the soil. The mineralization of organic matter in the gray soil zones is several times stronger than in the process of synthesis. Therefore, taken into account of the accumulation of humus in this type of soil, mineral fertilizers are added to the soil every year. It has been noted that using it along with lime and applying it to the soil gives good results.

**RESULTS AND DISCUSSION:**

Different types of soils can be found in the regions of Uzbekistan, such as typical sur, light-colored sur, meadow, meadow allvial, bald, and etc., in which the activity of enzymes is organized [Abdujalilova, and others. 1974; Buxrer et al .1976] .The humus content in the topsoil of these soils ranges from 0.5% to 0.7, 1.0, 1.3 and 1.6% and in some places 2.6%, whereas, the amount of elements such as nitrogen, phosphorus, potassium was found to be proportional to the amount of humus. It is noteworthy that the activity of enzymes in this zone is characterized by a strong continuation. In particular, the mineralization of humus which is based on their synthesis and the role of enzymes supplied to plants as nutrients during their active periods differ much from the complete and catalytic reaction in other zones. For example, the activity of the enzyme perioxidase in the soil is 3.20-5.60 mg/g, while the activity of polyphenol oxidase is 8.50-12.70 mg/g. The overall microbiological enzymatic activity in the soil zone is at an unprecedented level of development. In general, soil microorganisms are motile due to the fact that they change and multiply their offspring several times in one season is therefore known to give positive results. As a result, it leads to an increase in the elements necessary for plants, especially ammonia, nitrate, and fulvic acids, as well as an increase in biologically active substances in the soil. This means that the reserves of organic matter in irrigated soils do not accumulate spontaneously and from year to year. Therefore, humus is not eaten at all in planting and high yields in such soils. Consequently, the fertility of irrigated soils and crop yields will rise up. One of the most important tasks of any agricultural specialist is to increase and maintain the amount of mineral fertilizers used annually, especially due to the assimilation of minerals in the soil by cotton and their washing with jacob water. In addition to this reduction, it is advisable to use biological methods and biofertilizers based on biotechnology[Djumaniyozov 1991]. The activity of enzymes in the soil is not only directly related to the metabolism of microorganisms and soil conditions, but also to the synthesis of enzymes involved in metabolism [Galiuin et al. 1990; 1992; 2001; 2004.] For example, protease and urease carry out mineralization of organic nitrogen in soil. As a result of the process of nitrification and aminification in the soil, it leads to the formation of nitrogen compounds that are rapidly assimilated by plants. However, the function of the catalase enzyme is constantly changing, depending on the oxygen and other elements released from it, as well as the presence or absence of organic elements in the soil. For example, in the case of Uzbekistan, the activity of the enzyme catalase in sur soils is different, and their amount depends on the quantity of humus reserves in the soil. The above protease and urease enzymes are two-dimensional properties of reactions in the same environment. It is completed by the hydrolysis and mineralization of organic compounds. The flow of these two processes continues in conjunction with each other.

Additionally, the physicochemical changes of the soil, including the salinity and neutral conditions that occur in it, as well as changes in the humus content depend on the properties and reactivity of the nitrifying bases. In addition, the activity is consistent with the mobile phosphorus and potassium elements in the soil. In enhancing the activity of hydrolases in the soil, for example protease, urease enzymes, their use is also associated with various agrotechnical methods. However, depending on the composition and conditions of the soil, this bond may have a temporary feature of bonding.[Berjanova, Djumaniyozova, 2009; Djumaniyozova, Narbaeva 2009; Yuldasheva, Djumaniyozov 2009; Berdikulova 2009].

Experiments have shown that phosphatase activity depends, firstly, on the proliferation of microorganisms, and secondly, on the phosphorus content of the soil and the products of hydrolysis, mainly in the soil. This activity is caused by the formation of water-soluble phosphorus elements within the soil.The process allows the use of phosphatase enzyme activity in the precise determination of soil phosphorus. Among soil enzymes, polyphenol oxidase is the most complex enzyme inside of which there is a system that contains representatives of several enzymes, namely monophenoase, diphenoloxidase, tyrosinase, lactase, etc. The enzymes are representatives of phenol oxidized quinone, as well as the polymerization of its compounds and the oxidation of high molecules, the origin, as well as humus-like compounds. The enzyme peroxidase accelerates the oxidation of a number of phenols and aromatic amines by showing the main donor in the unit of humic substances [Tadjiev, 2008; Yuldasheva Djumaniyozov 2008; Netrusov .Kotova, 2007; Muradova, Tkachenko 2009; Bezborodov, 2006]. The activity of the enzyme dihydrogenase in the soil is reflected in the additional evaluation of the soil under the influence of anthropogenic factors [Potoskaya, lovchiy 2000].Polephenoloxidase accelerates the oxidation of phenols, and this oxidation leads to the transfer of humus to phenol which is also involved in the formation of complex dark-colored substances[MM Kononova, IV V Alexandrova 1956,1963]. Preliminary information about the occurrence of these enzymes in the soil was determined by scientists such as VF Kuprevich (1961) and later A.Sh. Galstyan (1958), K.A. Kozlov (1964).

Due to the nature of periosidase enzymes found in soil, it cannot be studied separately from polyphenolosidase enzymes. Both enzymes are directly involved. As a result, peroxidase oxidizes polyphenols very easily. Therefore, this enzyme plays a key role in the respiration of all plants. While the enzyme peroxidase is involved in the breakdown of organic matter, polyphenol oxidase is involved in a complex process such as the delivery of plant-assimilated nutrients.

Many experts studying the biological activity of the soil today are interested in a number of issues, such as microbiological processes in the soil, how they affect soil fertility and how significance they are. One of these issues is corncerned with the role of fertilizers in the soil decomposition in the presence of microorganisms, such as the processes of synthesis of substances, as well as the necessity of survey in ways of their reduction by linking them to enzymatic reactions.

In typical irrigated soils, the activity of peroxidase, polyphenol oxidase, dedigrogenase, urease, catalase enzymes under the influence of phosphorus-containing bacterial fertilizers increased by 1.0-1.5 times in the area of cotton crops. As a result of the application of mineral fertilizers (for example 150 kg/hct nitrogen, 135 kg/hct phosphorus and 68 kg/hct pure potassium), there was an accumulation of organic matter in the (planted cotton) soil at 39.6 tons of humus per hectare in the variant without fertilizers, 43.2 tons in the soil in the cotton field with complete mineral fertilizers, and 72 tons in the variant with natural fertilizers. Enzymatic activity (in the example of catalase), the amount of microorganisms also varied significantly in the obtained variants (see Table 1.1.1.).

**CONCLUSIONS:**

Obviously, the table shows that in the given variant of organic fertilizers [Toropkina, 1971] the increase in the amount of humus in the soil and the air and water permeability of the soil is normal, and grew to 2-3 billion compared to the fertilizers given for development with biogenic elements of microorganisms. The increase is 2-3 times faster than the fertilizer-free option as shown in the table.

Table 1.1.1

Typical irrigated soil humus, nitrogen content and catalase activity changes (depth 0-30 cm)

| Types of experiments | Humus content% | Total nitrogen% | Biogenicity of microorganisms per million | | catalase activity in 1 g of soil $0_2cm^3$ / mg | |
|---|---|---|---|---|---|---|
| | | | Per 1g humus | Per 1g nitrogen | Spring | Fall |
| Cotton planted without fertilizer | 1,11 | 0,07 | 1510 | 2120 | 9,1 | 7,7 |
| Mineral fertilizers applied to cotton | 1,22 | 0,09 | 3010 | 3400 | 7,9 | 6,3 |
| Organic fertilizers applied to cotton | 2,00 | 0,14 | 3300 | 2510 | 4,0 | 5,2 |

This means that the increase in the activity of enzymes in the topsoil varies depending on the type of fertilizer. For example, it can be seen that catalase has a high activity in the oxidation-reduction process, even in the non-fertilized variant. Its activity increased significantly in spring and decreased significantly in autumn. In addition, urease activity is also found in mineral fertilizers. It was found that the activity of the invertase increased 1.8 times and the invertase activity increased 1.4 times. The activity of enzymes in the fertilized variant increased 2-3 times.

In general, the activity of enzymes was found to vary throughout the growing season of cotton. The most characteristic feature is that in the case of chronic use of manure, the activity of fasatase is 0.10-0.14 mg/hct or more compared to other options. In the non-fertilized variant, the yield was 15.4 quintals per hectare, and when mixed with mineral fertilizers, it reached 43.7-49.2 quintals per hectare [Toropkina, 1965; 1967; 1971].

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